

THE UNITY OF THE GRASS STOOL IN ERAGROSTIS CURVULA

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Eragrostis curvula is a perennial bunch grass widely used as a ley grass in certain areas of South Africa. During the spring of 1959 a marked difference was observed in the production of shoots between various plants. All plants had been cut to within a few inches of the ground three months earlier, and were growing at varying distances from one another in an experiment designed to study the effects of espacement. The area between plants had been kept free of weeds and varied from 9 inches to 6 feet. Only those plants growing 3 feet, $4\frac{1}{2}$ feet and 6 feet apart showed growth, and this was limited to the North-East side of each plant only.

As a result of these observations, an investigation of the connections between one part of a grass stool and another was made. In adult plants the crown is composed of a large number of rooted, vegetative shoots that may be easily separated. Usually roots appear within a few weeks after the shoots have been produced. Separated parts, transplanted under favourable conditions, start new growth quickly. In the stool rooted shoots are linked together by short stolons which in older plants are heavily suberized, and apparently non-functional. The question arose therefore whether the portions of a mature grass stool were perhaps independent of each other, being only mechanically connected. In young plants on the other hand, the connecting stolons have a healthy appearance, and may be functional.

Six-week and two-year-old plants of *Eragrostis curvula* (Robusta blue strain) were transplanted into glass jars containing Miltner's nutrient solution. The plants were allowed sufficient time to recover from this treatment.

One portion of each plant was enclosed in a 1 litre flask in which radio-active carbon dioxide was liberated from $\text{BaC}^{14}\text{O}_3$. The leaves were exposed to a dosage of 77.5 mc. The plants were left in the flask for thirty hours (18 hours bright sunshine, 12 hours dark). At the end of this period, before removing the plants, all leaves outside the flask were cut as near to the crown as possible, and air-dried. The plants were then allowed to re-shoot, and after two weeks they were pressed and air-dried.

Survey autoradiographs of the dried material were made by mounting specimens on cardboard, and placing them in contact with plates of

Kodirex X-ray film in a light-proof cassette. Counts of the radio-active material were also measured.

It was possible to demonstrate radio-activity in the leaves outside the assimilation chamber. The activity in the ground air-dry material from the older plant as measured by infinite thickness was much less (av. 10 counts/min./mg., corrected for background), than that found in the corresponding leaves of the younger plant (av. 1,327). Generally the younger the leaves, or the nearer they are to the irradiated part of the plant, the higher the activity.

After two weeks the following counts were obtained for air-dried material of exposed leaves: 2,429 counts/min./mg. (young plants) and 61 counts/min./mg. (old plants). When we assume that the decrease in activity during this period was proportional for both young and old plants, we can conclude that a greater percentage of material was transported in the former. Nevertheless some transport had taken place through the old stolons which therefore were still physiologically active to some extent.

Evidently the grass stool behaves as a unit even at a later stage. It is found, however, that growth can proceed more rapidly in one part than in another.

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